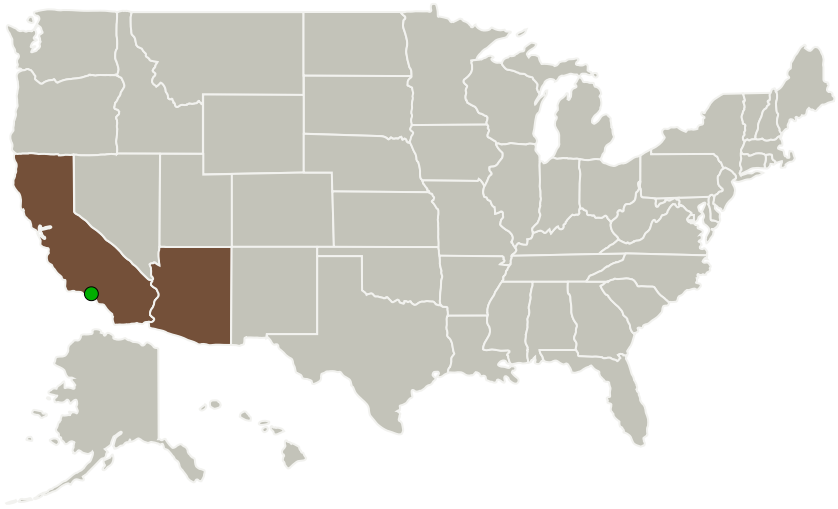
SiGe 130 nm-based Rad-Hard ADC for the JEO Mission, Phase I

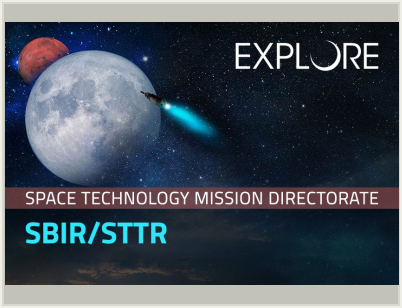
Completed Technology Project (2011 - 2011)

Project Introduction

Ridgetop will demonstrate the feasibility of developing a radiation-hardened analog-to-digital converter (ADC) suitable for the Jupiter Europa Orbiter mission. This proposal responds to topic S1.09, In-Situ Sensors and Sensor Systems for Planetary Science. With this innovation, the ADC will be hardened to significantly higher levels of radiation (5 Mrads) than currently existing ADCs, and its performance will still clearly exceed the performance of ADCs used previously on NASA planetary missions. The ADC will have 12-bit resolution, 125 MSPS sampling speed, and low 150 mW power consumption. The ADC will be designed on the IBM 8HP 130 nm silicon germanium (SiGe) fabrication process, which has been shown to be tolerant to very high levels of total ionizing dose (TID) radiation and suitable for wide temperature range operation. At the end of Phase 1, the proven mixed-signal circuits will provide momentum to create an radiation-hardened, transistor-level ADC design in a follow-on SBIR Phase 2 Program, in which the ADC will be fabricated in the IBM 8HP 130 nm BiCMOS SiGe process and tested.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Ridgetop Group, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Tucson, Arizona
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
Arizona	California

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138498)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Ridgetop Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

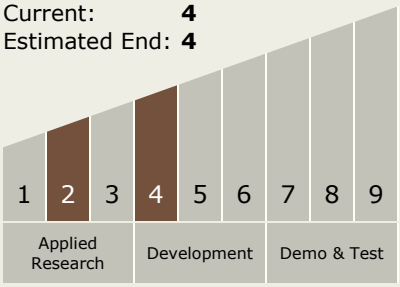
Carlos Torrez

Principal Investigator:

Esko O Mikkola

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.6 Data Acquisition Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System